

24. (Amended) The print method according to Claim 23, wherein said scanning step is performed by a plurality of scans in forward and backward scanning directions of the recording head.

REMARKS

This application has been reviewed in light of the Office Action dated September 28, 2001. Claims 1-24 are pending in this application. Claims 1, 7, 12, 17, 20, 23, and 24 have been amended to define still more clearly what Applicants regard as their invention. Claims 1, 17, 20, and 22 are in independent form. Favorable reconsideration is requested.

Claims 1-19 were rejected under 35 U.S.C. § 112, second paragraph, as being incomplete for omitting from the claims a controller, the scanning device or structure, and the ink nozzles of respective colors. Applicants have amended Claims 1, 17, 20, and 22 and added, e.g., to Claim 1 a scanner, controller, and print control means element. Consequently, Applicants submit that the rejection under Section 112, second paragraph, has been obviated, and its withdrawal is therefore respectfully requested.

The Office Action rejected Claims 1-17 and 20-24 under 35 U.S.C. § 102(e) as being anticipated by Japanese Patent Application 3-45351 (Iwazawa), and rejected Claims 18 and 19 under 35 U.S.C. § 103(a) as being unpatentable over Iwazawa. Applicants respectfully traverse these rejections.

The aspect of the present invention set forth in Claim 1 is a print apparatus which forms a color image by applying ink materials of plural colors onto a print medium and uses a recording means having a plurality of nozzles to eject ink materials. The apparatus scans in a direction of the plurality of nozzles and in forward and backward scanning directions. The apparatus also controls the movement of the recording head in

the forward and the backward scanning directions, and controls the printing by controlling the nozzles. The apparatus controls the symmetric ejection order of a plurality of colors from the plurality of nozzles onto a pixel area to form a secondary color.

One important feature of Claim 1 is controlling the symmetric ejection order of a plurality of colors from the plurality of nozzles onto a pixel area to form a secondary color. Applicants note that this feature is discussed in the specification, at least at page 19, line 3 to page 21, line 20 and is shown on Figure 5. In Figure 5, for example, the application orders of cyan ink and magenta ink are different between dot 120 and dot 121, which are recorded onto a pixel area 130 of a secondary color, the secondary color being blue in this particular example. (It is to be understood, of course, that the scope of Claim 1 is not limited to the details of this embodiment, which is referred to only for purposes of illustration.)

Iwazawa, as understood by Applicants, relates to a color printer that has a nozzle group for forward printing and a nozzle group for reverse printing, and these nozzle groups are changed over between the forward scan and the reverse scan. Applicants submit that the drawbacks of color printers of the type shown in Iwazawa are discussed in the specification of the present application, at least at page 3, lines 14-18 and page 4, lines 10-24. For example, by switching nozzle groups for the forward and reverse scan, an uneven color with a band-like shape can result, the uneven color being caused by using two different nozzle groups. Applicants also pointed out in their application that where there was a difference between the temperature increasing rates of the recording heads due to the difference between the ratios of the forward and backward data from interference with data, there was a difference in ejection amounts between the recording heads, and the uneven color occurred in the band-like shape. Applicants submit that nothing has been found in Iwazawa that would teach or suggest a print apparatus that creates a pixel structure by

ejecting, in a symmetrical order, a plurality of colors, as recited in Claim 1. Accordingly, Applicants submit that at least for this reason, Claim 1 is patentable over Iwazawa.

Independent Claims 17, 20, and 22 include the same feature of creating a pixel structure by ejecting, in a symmetrical order, a plurality of colors, as discussed above in connection with Claim 1. Accordingly, Claims 17, 20, and 22 are believed to be patentable for at least the same reasons as discussed above in connection with Claim 1.

The other rejected claims in this application depend from one or another of the independent claims discussed above, and, therefore, are submitted to be patentable for at least the same reasons. Since each dependent claim is also deemed to define an additional aspect of the invention, individual reconsideration of the patentability of each claim on its own merits is respectfully requested.

In view of the foregoing amendments and remarks, Applicants respectfully request favorable reconsideration and early passage to issue of the present application.

Applicants' undersigned attorney may be reached in our New York Office by telephone at (212) 218-2100. All correspondence should continue to be directed to our address listed below.

Respectfully submitted, ✓

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VERSION WITH MARKINGS TO SHOW CHANGES MADE TO CLAIMS

1. (Amended) A print apparatus [for forming] which forms a color image by applying ink materials of plural colors onto a print medium, [while scanning a recording head in two directions,] using a recording means having a plurality of nozzles to eject ink materials, said apparatus comprising:

a scanner to scan the recording means in forward scanning and backward scanning directions, wherein said scanner scans along an arrangement direction of the plurality of nozzles;

a controller to control a movement of the recording head in the forward scanning and the backward scanning directions; and

a print controller to control the printing by means of said plurality of nozzles,

[wherein, in order to make orders of application of an ink material of a certain color out of ink materials of plural colors applied onto a pixel area of a secondary color to form the secondary color, symmetric with respect to an ink material of another color, at least the ink material of said certain color is applied plural times onto said pixel area] wherein said print controller controls the symmetric ejection order of a plurality of colors from said plurality of nozzles onto a pixel area to form a secondary color.

7. (Amended) The print apparatus according to Claim 6, wherein said recording head comprises recording elements for applying at least ink materials of cyan, magenta, and yellow, [and] wherein, with respect to a recording element corresponding to either

[one] a certain color, the recording elements corresponding to the other colors are located in symmetry in the scanning direction.

12. (Amended) The print apparatus according to Claim 1, wherein the ink materials of the plural colors applied to said pixel area are applied by plural scans in [different] forward and backward scanning directions of said recording head.

17. (Amended) A print apparatus [for forming] which forms a color image by applying ink materials of plural colors onto a print medium [while scanning a recording head in two directions] using a recording means having a plurality of nozzles to eject ink materials, said apparatus comprising,

a scanner to scan the recording means in forward scanning and backward scanning directions, wherein said scanner scans along an arrangement direction of the plurality of nozzles;

a controller to control a movement of the recording head in the forward scanning and the backward scanning directions; and

a print controller to control the printing by means of said plurality of nozzles,

[wherein, in order to make orders of application of an ink material of a certain color out of ink materials of plural colors applied onto a pixel area of a process color to form the process color, symmetric with respect to an ink material of another color, at least the ink material of said certain color is applied plural times onto said pixel area]

wherein said print controller controls the symmetric ejection order of a plurality of colors from said plurality of nozzles onto a pixel area to form a process color.

20. (Amended) A print method [for forming] which forms a color image by applying ink materials of plural colors onto a print medium [while scanning a recording head in two directions] using a recording means having a plurality of nozzles to eject ink materials, said method comprising the following steps:

scanning the recording means in forward scanning and backward scanning directions, wherein the scanning is performed along an arrangement direction of the plurality of nozzles;

controlling a movement of the recording head in the forward scanning and the backward scanning directions; and

controlling the printing by means of the plurality of nozzles,

[a first step of applying an ink material of a certain color for forming a secondary color in a pixel area of said secondary color;

a second step of applying an ink material of another color onto said pixel area for forming said secondary color in combination with said certain color, after the application of the ink of said certain color; and

a third step of applying the ink material of said certain color onto said pixel area, after the application of the ink material of said another color]

wherein, in said printing control step, the printing controls the symmetric ejection order of a plurality of colors from the plurality of nozzles onto a pixel area to form a secondary color.

22. (Amended) A print method [for forming] which forms a color image by applying ink materials of plural colors onto a print medium [while scanning a recording head in two directions] using a recording means having a plurality of nozzles to eject ink materials, said method comprising the following steps:

scanning the recording means in forward scanning and backward scanning directions, wherein the scanning is performed along an arrangement direction of the plurality of nozzles;

controlling a movement of the recording head in the forward scanning and the backward scanning directions; and

controlling the printing by means of the plurality of nozzles,

[a first step of applying an ink material of a certain color for forming a secondary color in a pixel area of said secondary color;

a second step of applying an ink material of another color onto said pixel area for forming said secondary color in combination with said certain color, after the application of the ink of said certain color; and

a third step of applying the ink material of said certain color onto said pixel area, after the application of the ink material of said another color]

wherein, in said printing control step, the printing controls the symmetric ejection order of a plurality of colors from the plurality of nozzles onto a pixel area to form a process color.

23. (Amended) The print method according to Claim 22, wherein said recording head comprises two sets of recording elements for applying the ink material of said certain color and recording elements for applying the ink material of said another color arranged in symmetry in the scanning direction, and

wherein said [first step and said second step are carried out by one scan of scan] scanning step is performed by the recording head.

24. (Amended) The print method according to Claim 23, wherein said [first step and said second step are carried out] scanning step is performed by a plurality of scans in [different] forward and backward scanning directions of [said] the recording head.